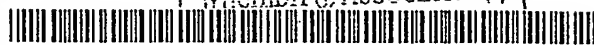


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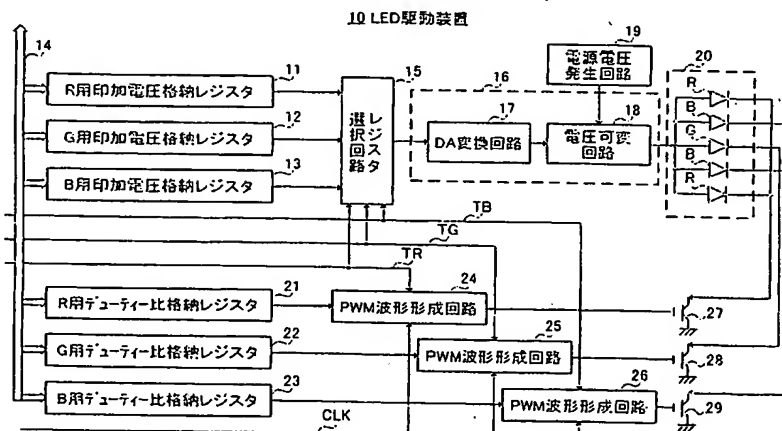
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[続葉有]

(54) Title: LED DRIVE DEVICE AND LED DRIVE METHOD

(54) 発明の名称: LED駆動装置及びLED駆動方法



(57) Abstract: Drive voltage of LED of each color is stored in application voltage storage registers (11, 12, 13) so that each LED is driven by independent drive voltage, thereby reducing the current consumption. Moreover, the data in the application voltage storage registers (11, 12, 13) can be rewritten via a storage value setting bus (14). When the LED's actually mounted have individual irregularities in minimum light emitting voltage, the voltage stored in the application voltage storage registers (11, 12, 13) can be modified according to the irregularities.

(57) 要約: 各色LEDの駆動電圧を印加電圧格納レジスタ11、12、13に記憶させ、各色LEDを独立の駆動電圧で駆動することで、消費電流が低減される。また印加電圧格納レジスタ11、12、13のデータを格納値設定用バス14を介して書換え可能とし、実際に搭載されるLEDに個体差による最小発光電圧のばらつきがある場合に、これに応じて印加電圧格納レジスタ11、12、13に記憶させる電圧を適宜変更できるようにする。

- 10...LED DRIVE DEVICE  
11...APPLICATION VOLTAGE STORAGE REGISTER FOR R  
12...APPLICATION VOLTAGE STORAGE REGISTER FOR G  
13...APPLICATION VOLTAGE STORAGE REGISTER FOR B  
15...REGISTER SELECTION CIRCUIT  
19...POWER SOURCE VOLTAGE GENERATION CIRCUIT  
17...DA CONVERSION CIRCUIT  
18...VOLTAGE VARYING CIRCUIT  
21...DUTY RATIO STORAGE RATIO FOR R  
22...DUTY RATIO STORAGE RATIO FOR G  
23...DUTY RATIO STORAGE RATIO FOR B  
24...PWM WAVEFORM FORMATION CIRCUIT  
25...PWM WAVEFORM FORMATION CIRCUIT  
26...PWM WAVEFORM FORMATION CIRCUIT

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SZ, TZ, UG, ZM, ZW), ユーラシア (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), ヨーロッパ (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

添付公開書類:

— 国際調査報告書

— 補正書

2文字コード及び他の略語については、定期発行される各PCTガゼットの巻頭に掲載されている「コードと略語のガイダンスノート」を参照。

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2004/004313

## A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl<sup>7</sup> H01L33/00, G09G3/20, G09G3/34, G09G3/36, H05B37/02

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl<sup>7</sup> H01L33/00, G09G3/20, G09G3/34, G09G3/36, H05B37/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho 1922-1996 Toroku Jitsuyo Shinan Koho 1994-2004

Kokai Jitsuyo Shinan Koho 1971-2004 Jitsuyo Shinan Toroku Koho 1996-2004

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2003-058125 A (Konica Corp.), 28 February, 2003 (28.02.03), Full text; all drawings (Family: none)	1, 2, 8
X	JP 11-115241 A (Citizen Kabushiki Kaisha), 27 April, 1999 (27.04.99), Full text; all drawings (Family: none)	1, 2, 8
X	JP 2000-029400 A (Hewlett-Packard Co.), 28 January, 2000 (28.01.00), Full text; all drawings & EP 967590 A1 & US 6239716 B1	1, 2, 8

☒ Further documents are listed in the continuation of Box C.☐ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search  
29 June, 2004 (29.06.04)Date of mailing of the international search report  
27 July, 2004 (27.07.04)Name and mailing address of the ISA/  
Japanese Patent Office

Authorized officer

Facsimile No.

Telephone No.

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2004/004313

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2000-503133 A (Cree Research, Inc.), 14 March, 2000 (14.03.00), Full text; all drawings & WO 97/24706 A2                      & EP 870294 A2 & EP 989539 A1                         & EP 1139325 A1 & US 5812105 A	1, 2, 8

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2004/004313

## Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

The search has revealed that the technical feature common to claims 1-16 is not novel.

Accordingly, there exists no common technical feature which can be considered as a special technical feature within the meaning of PCT Rule 13.2, second sentence.

Claims 2, 8 relate to use of a writable memory as application voltage storage means.

Claim 3 relates to a technical feature that an independent application voltage value is stored even for the LED of the same color.

(Continued to extra sheet)

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1, 2, 8

### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2004/004313

Continuation of Box No.III of continuation of first sheet(2)

Claims 4-6, 14 relate to a technical feature that duty ratio storage means is provided.

Claim 7 relates to a technical feature that red LED's are dependently connected to one another.

Claims 9-12, 15, 16 relate to a feedback control using detection means.